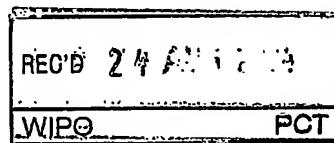




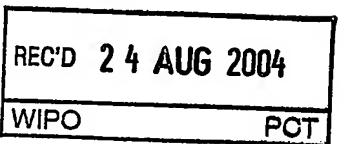
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I, JULIE BILLINGSLEY, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2004900814 for a patent by CTECH EQUIPMENT PTY. LTD as filed on 18 February 2004.

I further certify that the above application is now proceeding in the name of CTECH CLOSURES PTY LTD pursuant to the provisions of Section 113 of the Patents Act 1990.



WITNESS my hand this
Twelfth day of August 2004



J. Billingsley

JULIE BILLINGSLEY
TEAM LEADER EXAMINATION
SUPPORT AND SALES



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Tamper Evident Closure Device for a container.

The present invention addresses the need for a proper relationship between sealing means and tamper evidence means such that the tamper evidence means operates prior to the seal being breached. This avoids the possibility apparent with many so-called tamper evident closures whereby by malicious tampering or inappropriate application torque and/or relaxation of the closure causing the seal between closure and container neck to be breached without the tamper evidence means operating and allowing the contents to be degraded by action of atmosphere or malicious introduction of contaminants.

The present invention is a closure and closure mould assembly and a corresponding container neck and the following example is a non-limiting example.

the neck consisting

an outer wall having

an external thread which co-operates with an internal thread on the closure

a tamper bead to co-operatively engage with the tamper evidence ring on the closure

an inner wall

a top wall joining the outer and inner walls

the closure consisting

a disc with an upper and lower wall and depending from the lower wall of the disc

one or more sealing means including but not limited to annular sealing means depending from the lower wall of the closure disc and/or the inner wall of the closure skirt or any combination thereof and such sealing means to sealingly engage

in such manner as to create a seal between closure and container that will have at least one sealing means operating until the tamper evident ring is substantially separated from the closure skirt thus giving clear evidence of the seal being breached.

with any one or more of or in any combination of
the inside wall of the container neck
the top wall of the container neck
the outer wall of the container neck

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one or more retention means to retain for example a cup or container within the closure or depending from the closure. Such retention means may include but is not limited to annular or interrupted annular retention means depending from the lower wall of the closure disc such that an object (such as a cup or receptacle or disc or device) may be engaged with the retaining means such that the object is held in position whilst the closure is in use or alternatively the object but may be removed to access the contents (such as food or beverage additives) of the receptacle. Such retention means being for example but not limited to one or more of clips, projections, recesses, rings, annular flange, interrupted annular flange annular groove or recess interrupted annular groove or recess

a skirt the skirt having

an inner wall with a raised thread which co-operates with the external thread on the neck of the container

an outer wall which may have raised areas to co-operate with means to apply the closure to the container neck and or means to eject the closure from a mould.

a lower wall between the tamper evidence means and the skirt the lower wall having

a tamper evidence ring depending from the lower wall by means of frangible bridges the ring having any one or more of and in any combination thereof which combination may omit one or more of an outside wall
an inside wall
collectively shaped to provide and/or be manipulated to provide means of ejection from the mould and engagement means with the tamper bead on the neck of the container such engagement means consisting of but not limited to any one or more of and in any combination thereof which combination may omit one or more of a folded flap which may be thicker at one end than the other and which may be shaped to facilitate folding
a projection which may be shaped so as to engage with the tamper bead on the container neck but also shaped to assist removal from the mould

The mould assembly comprising first and second mould portions which co-operate to define when in a closed position, a closure cavity;

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the first mould portion containing the means of injection of polyolefin material and defining or partially defining the external features of the top disc and skirt of the closure and one or more raised features on the exterior of closure which may co-operate with closure application means or closure ejection means.

The second mould portion having one or more of and or means of co-operation between and in any combination thereof

a threaded core shaped to define any one or more of and in any combination thereof which combination may omit one or more of threads on the inner wall of the closure skirt such threads co-operating with the threads on the neck of the container

annular sealing means depending from the lower wall of the closure disc and/or the inner wall of the closure skirt or any combination thereof and such sealing means to sealingly engage with any one or more of or in any combination of

the inside wall of the container neck
the top wall of the container neck
the outer wall of the container neck

annular or interrupted annular retention means depending from the lower wall of the closure disc such that an object (such as a cup or receptacle or disc or device) may be engaged with the retaining means such that the object is held in position whilst the closure is in use or alternatively the object but may be removed to access the contents (such as food or beverage additives) of the receptacle. Such retention means for example but not limited to one or more of clips, projections, recesses, annular flange, interrupted annular flange annular groove or recess interrupted annular groove or recess

an annular support ring shaped and positioned to form one or more of or portion of and in any combination thereof which combination may omit one or more of

part of the outside wall of the skirt
a projection on the outside wall of the skirt
a shoulder defining the lower extremity of the skirt
at least a portion of the tamper evident ring
one or more frangible bridges connecting the skirt to the tamper evident ring

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an outer core which co-operates with the threaded core and the support ring to define at least portion of an annular tamper evident ring and by co-operative movement relative to the support ring and the threaded core creates a space into which the tamper evident ring may deflect to assist ejection of the closure.

one or more inner cores which may be shaped to define at least portion of the one or more of and annular sealing means and or annular or interrupted annular retention means and which by collective co-operation and relative movement between the said inner cores and the threaded core assists ejection of the closure from the mould.

the inner cores and the threaded core co-operating and by relative forward or opening movement in relation to the support ring cause the closure whilst still remaining on the said inner cores and threaded core to move away from the support ring.

the inner cores and the threaded core co-operating and by relative forward or opening movement of one or more of the inner cores relative to the threaded core eject the closure off the threaded core.

Alternatively the support ring may move forward relative to the threaded core thereby withdrawing the threaded core from the closure and further forward movement by the inner core or cores removes the closure from contact with the support ring and ejects the closure from the mould

If the closure is still retained on the inner cores by portion of the closure such as the said retention means then by co-operative forward or opening movement of the innermost core relative to the other inner core the closure may be ejected off the inner core.

The present invention includes a cup or receptacle (not shown) shaped with features which co-operate with the said retention means within the closure such means of co-operation being for example but not limited to one or more of clips, projections, recesses, annular flange, interrupted annular flange annular groove or recess interrupted annular groove or recess.

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In a further non-limiting aspect of the invention suitable for use with or without cup retention means we show in Fig. 2 a tamper evident closure 10 (shown partially) with a top wall 20 and an annular sealing device 40 sealingly engaging the inside wall 65 of the container neck 60 and another annular sealing device 41 which may also but not necessarily be used to sealingly engage with either or both the upper wall 63 and the outer wall 64 of the container neck 60 (shown not fully sealingly engaged). The design of the closure being such that when the closure is fully applied

the distance 'A' (being the distance over which an interference fit and seal continues to occur between the annular sealing device 40 and the inner wall 65 of the container neck 60 during removal of the closure from the fully applied position (not shown) on the container neck and further described as being the distance between line A1 [being the line touching the top wall 63 of the container neck] and the line A2 [being the line touching point of sealing engagement between annular sealing device 40 and the inner wall 65 of the container neck 60 measured at the point when the closure is fully applied(not shown) to the container neck

shall be always sufficiently larger than the distance 'B' (being the distance between the engagement surface 61 of the tamper bead 62 and the engagement surface 59 of the tamper ring engagement means 58 when the closure is fully applied to the container) plus a distance 'C' (not shown) equalling the amount of compression that occurs in the tamper ring engagement means during the process of removal plus a distance 'D' (not shown) equalling the amount of stretch that occurs under stress during closure removal in the frangible bridges 50 connecting the tamper evidence annular ring 55 to the closure skirt 30 plus a distance 'E' (not shown) being the distance equal to the tolerance allowed in the measurement specifications of the container neck 60 and the closure 10 plus as may be required a distance for margin of safety for a particular closure and neck combination.

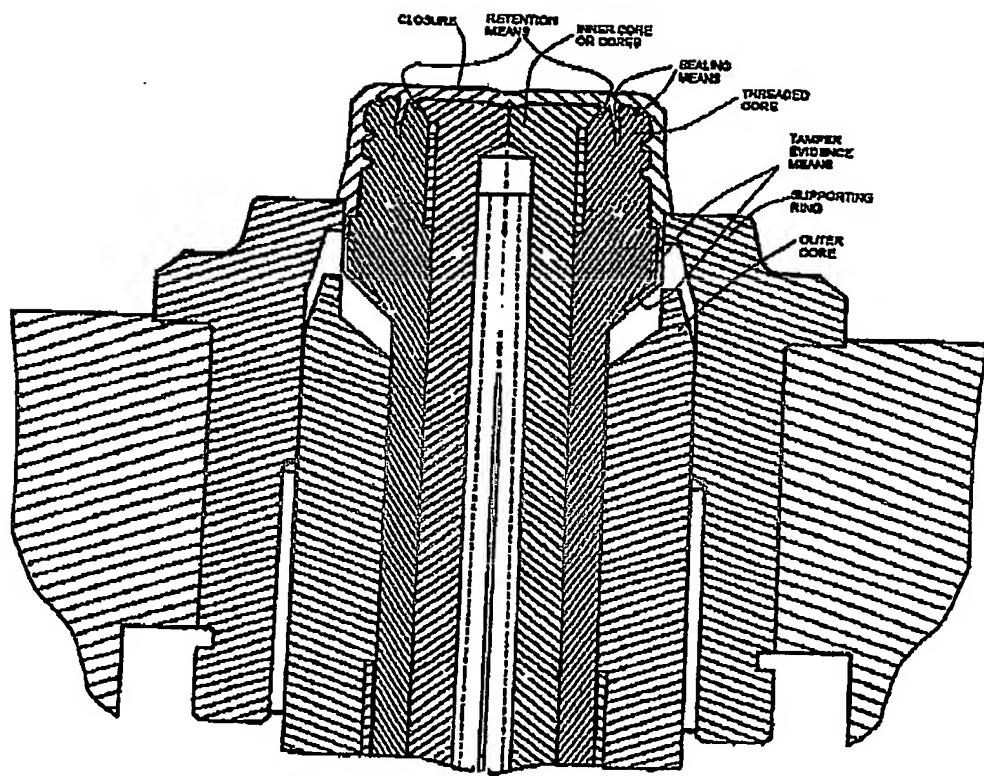
By observing this formula in designing a closure then the closure will be in sealing engagement with the container neck until after tamper evidence is displayed thereby ensuring that no contamination of contents can occur without tamper evidence. Persons skilled in the art may reveal alternate versions of this closure closure system without departing from the present invention.



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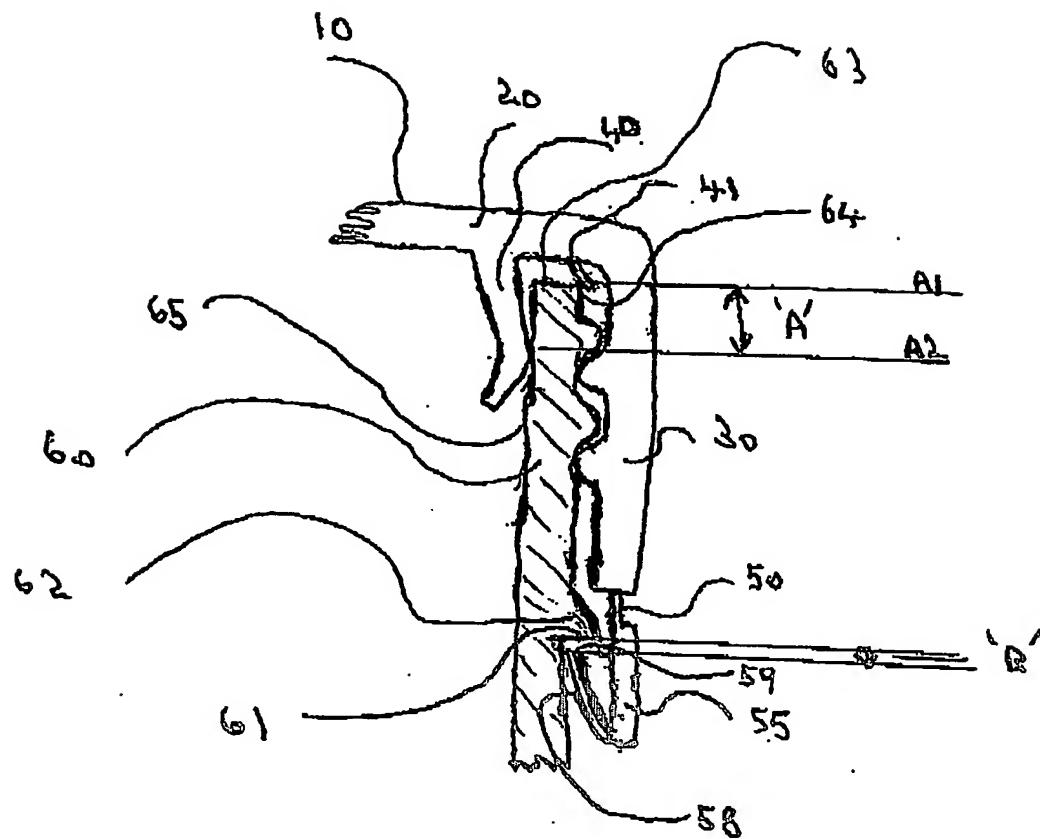
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FIG 1



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FIG 2.

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